

(12) UK Patent Application (19) GB (11) 2 342 536 (13) A

(43) Date of A Publication 12.04.2000

(21) Application No 9822108.8

(22) Date of Filing 09.10.1998

(71) Applicant(s)

Orange Personal Communications Services Limited
(incorporated in the United Kingdom)
St James Court, Great Park Road, Almondsbury,
BRISTOL, BS12 4QJ, United Kingdom

(72) Inventor(s)

Andrew Dowden
James Colby

(74) Agent and/or Address for Service

R G C Jenkins & Co
26 Caxton Street, LONDON, SW1H ORJ,
United Kingdom

(51) INT CL⁷
H04Q 7/22

(52) UK CL (Edition R)
H4L LDPP

(56) Documents Cited
WO 98/09453 A2 WO 96/20572 A1

(58) Field of Search
UK CL (Edition Q) H4K KF42 , H4L LDPP LECX
INT CL⁸ H04M 3/42 3/48 , H04Q 7/22 7/32
Online: WPI, PAJ, EPODOC

(54) Abstract Title
Call back facility

(57) The apparatus comprises means for receiving a callback request signal on the basis of a non-circuit-related data transfer mechanism, such as a short message signal (SMS) message or an Unstructured Supplementary Service Data (USSD) message, transmitted from a mobile station. In response to the received callback request signal the apparatus establishes a first circuit connection to the mobile station, and a second circuit connection to a third party on the basis of information contained in the received callback request signal. The apparatus then bridges the first and second circuit connections.

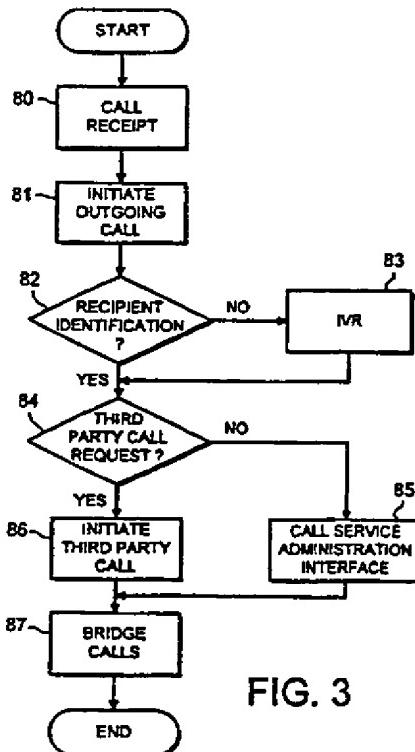


FIG. 3

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

GB 2 342 536 A

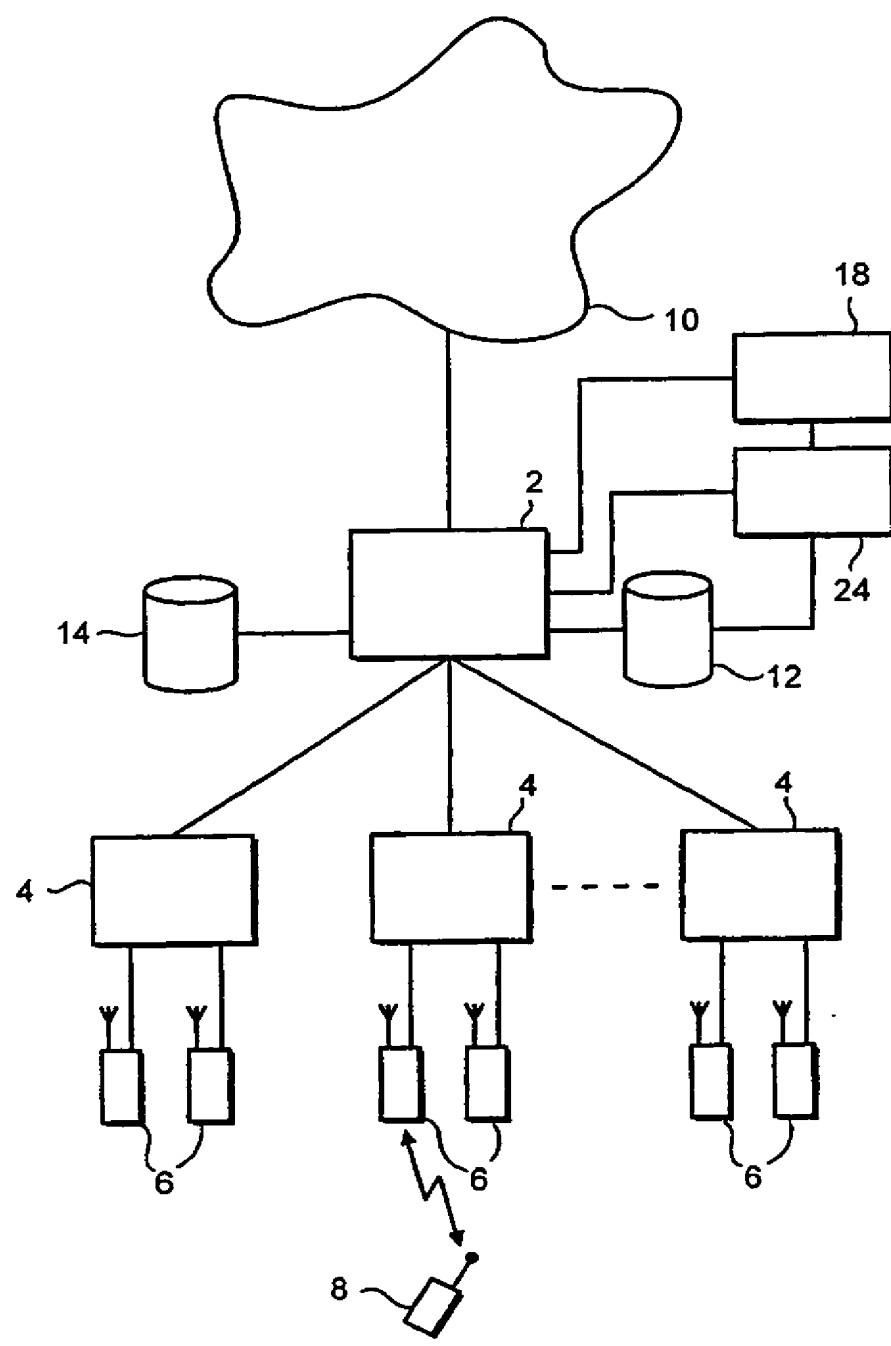


FIG. 1

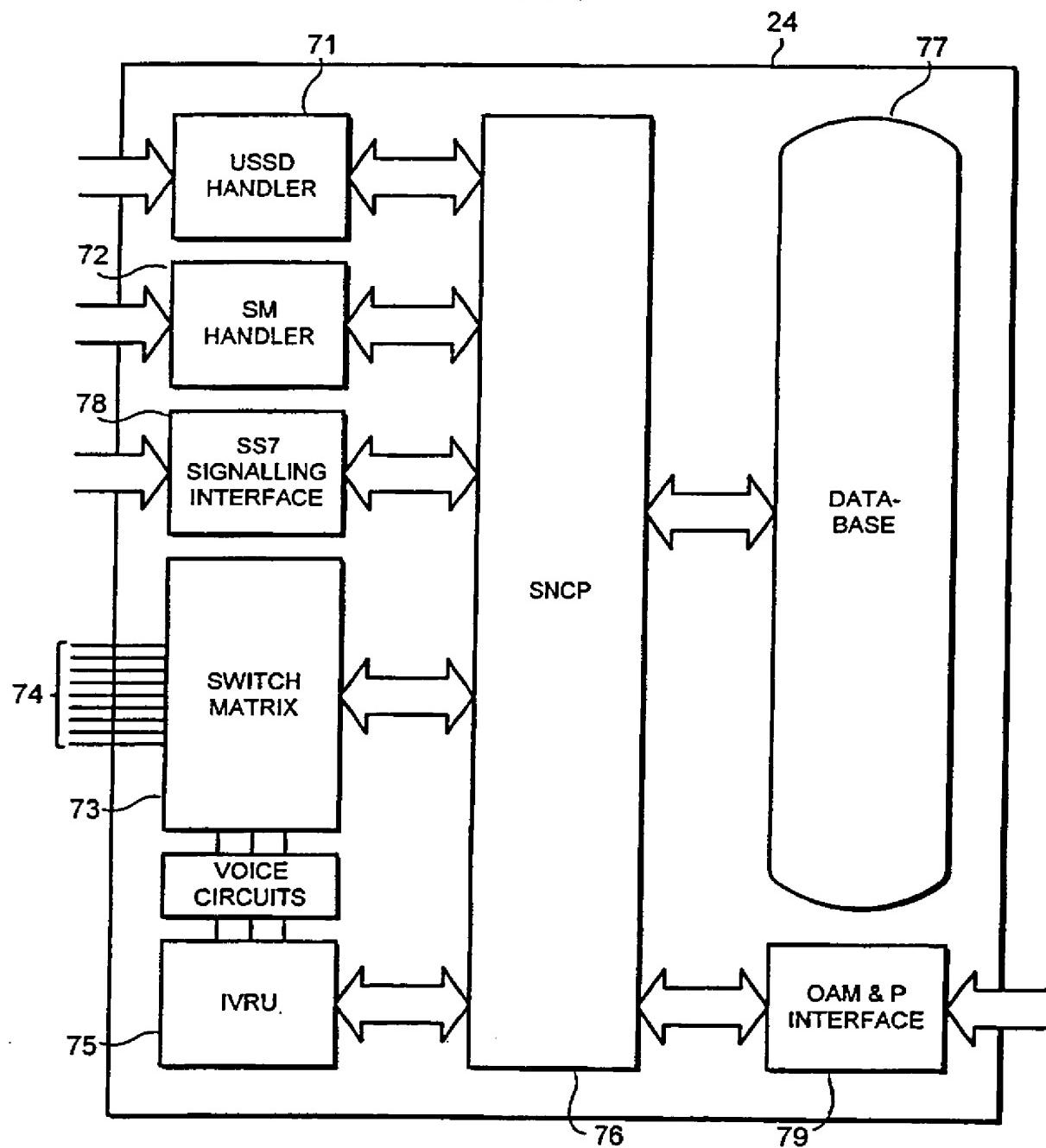


FIG. 2

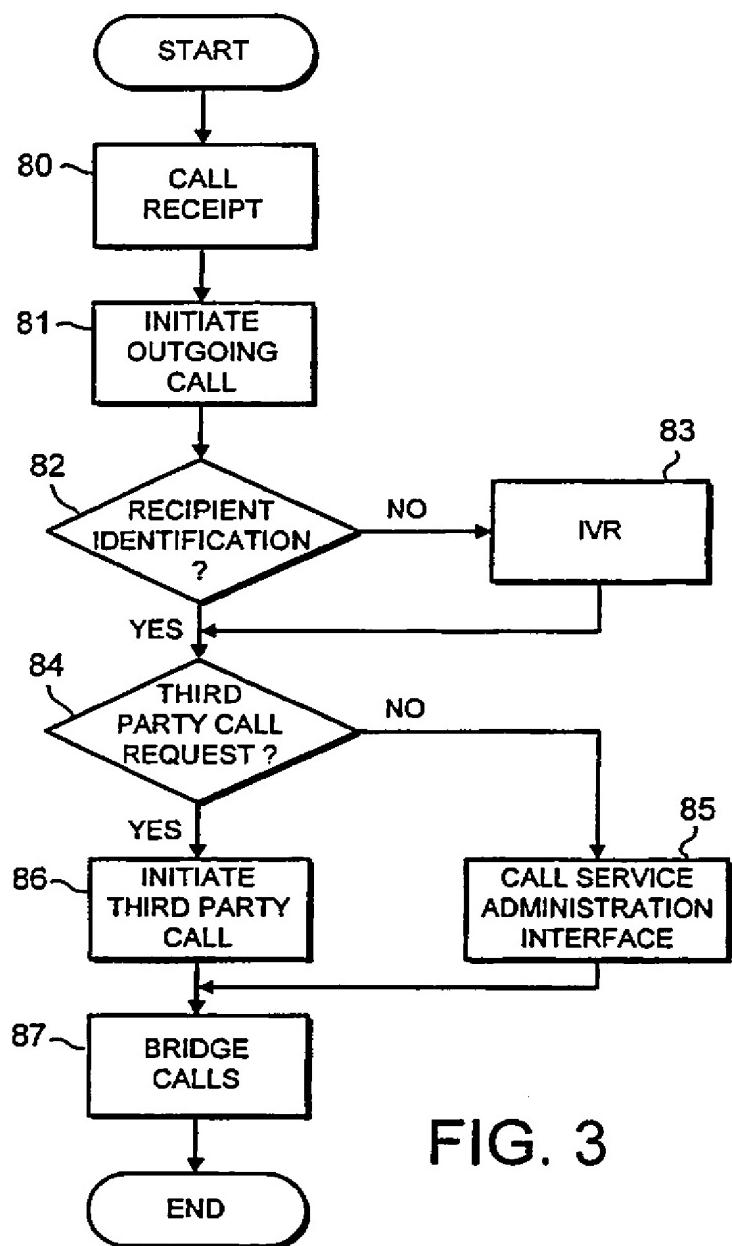


FIG. 3

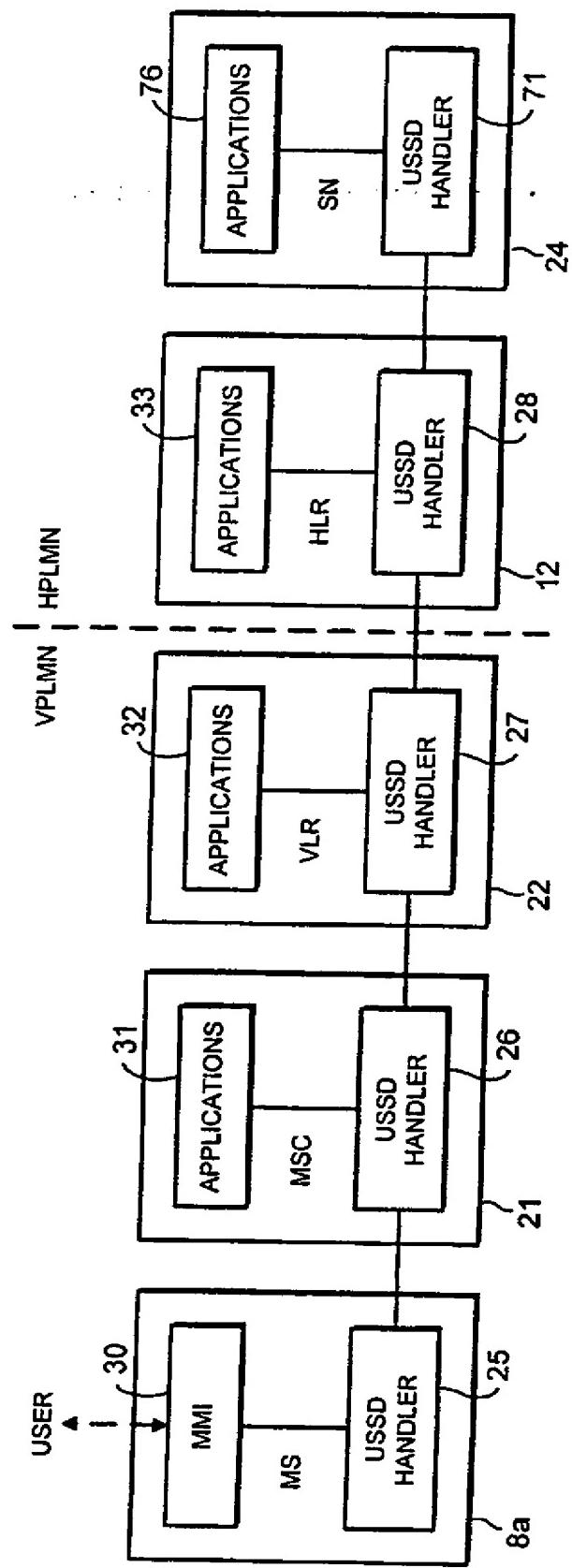


FIG. 4

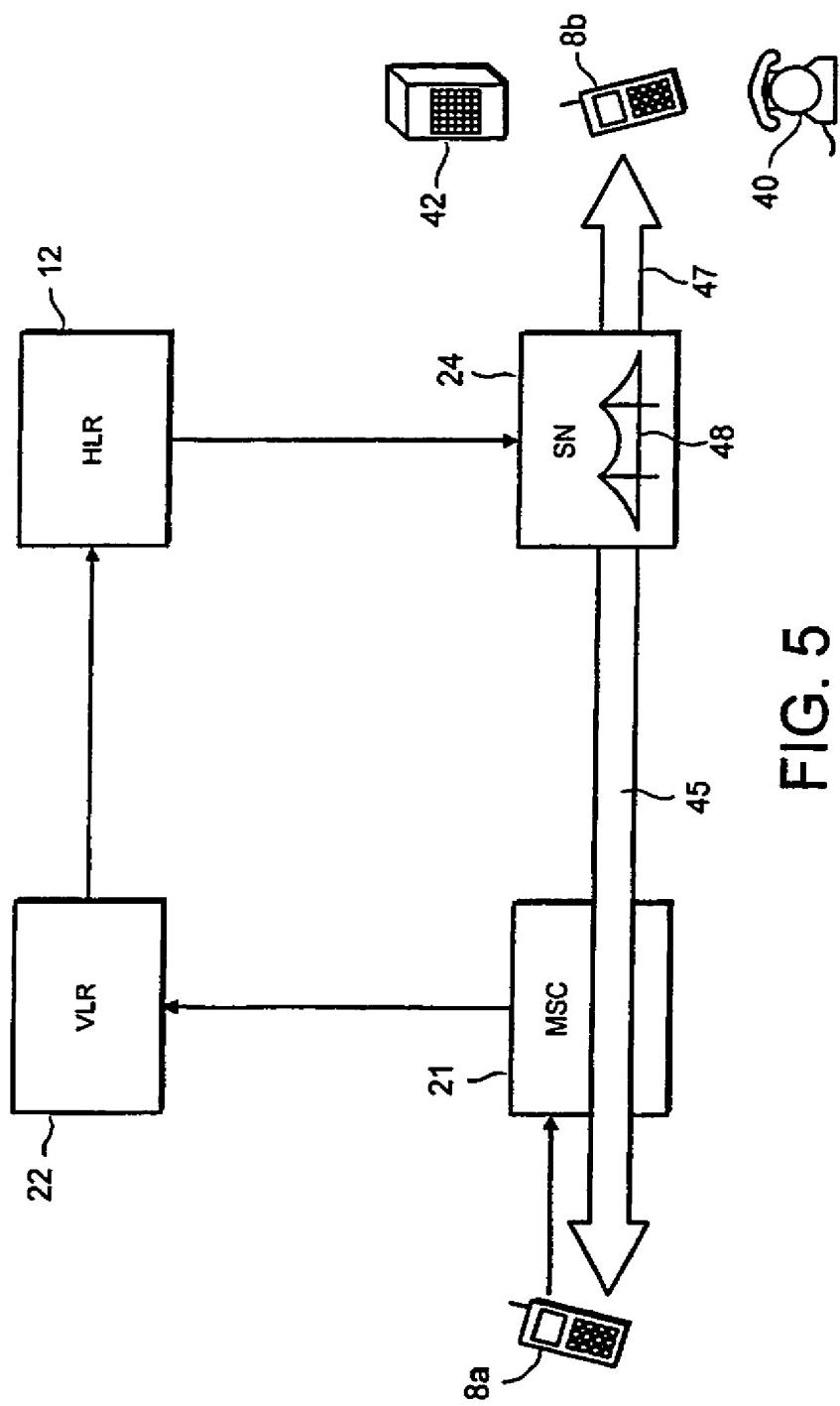


FIG. 5

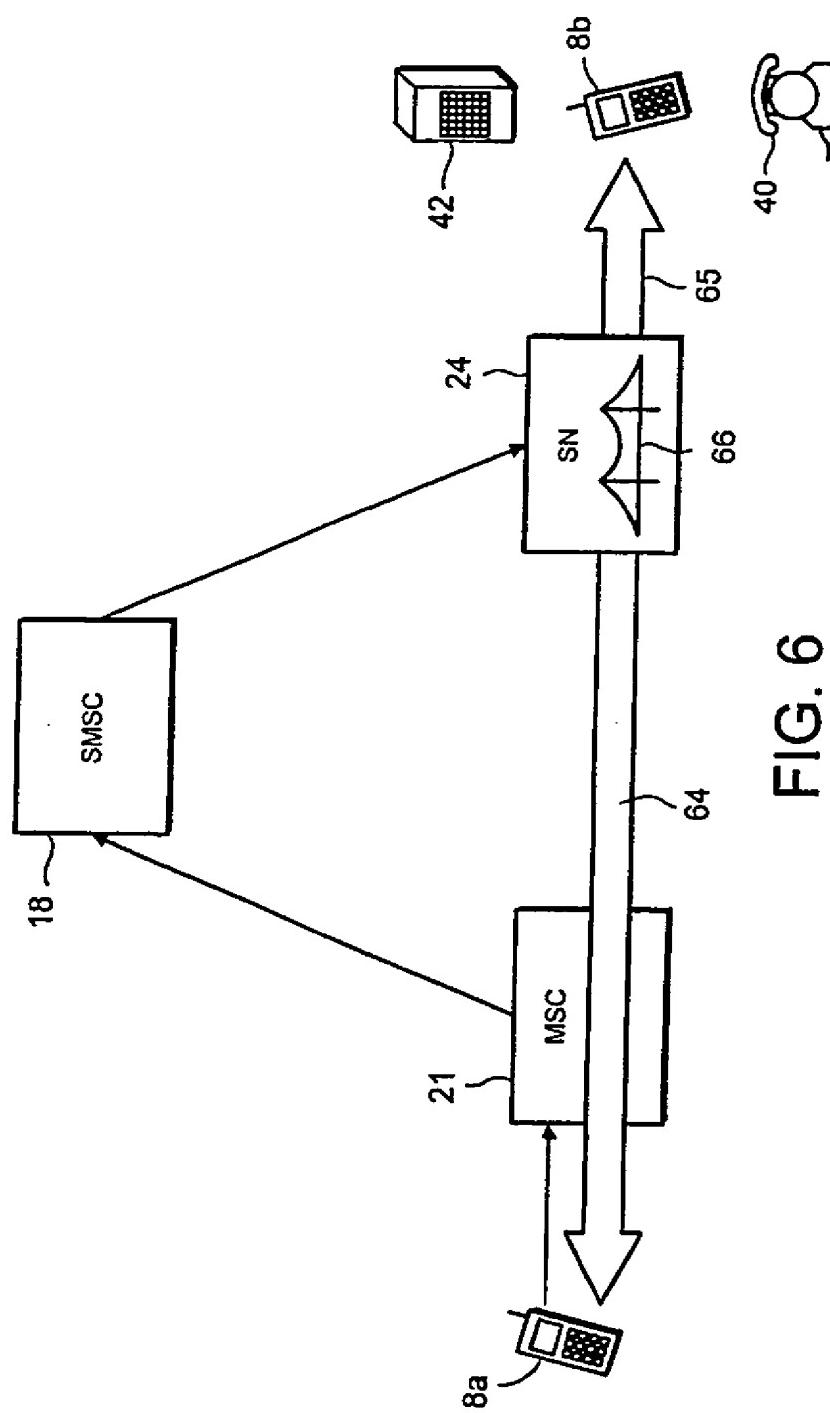


FIG. 6

MOBILE COMMUNICATIONS

Background of the Invention

This invention relates to mobile communications, and more specifically but not exclusively to apparatus for and methods of establishing circuit connections in a mobile communications system such as a GSM (Global System for Mobile Communications) digital cellular radio network.

If a subscriber is outside his home network and is roaming in a visited (foreign) network, any call initiated by the subscriber from his mobile station is established from the visited network. International call rates charged by a visited network for a call made to a party in the home network can be considerably higher than that charged by the home network for a call to the roaming subscriber established from the home network. It would be desirable to provide apparatus and methods enabling, *inter alia*, cheaper call rates for roaming subscribers.

In the field of telecommunications, callback methods for setting up calls in a reverse direction are known, for example from US-A-5438616 and US-A-5710809.

US-A-5438616 describes a fixed line telephone system comprising a first and a second party interconnected via a controller. Initially, a first connection is established between the first party and the controller by the first party placing a telephone call to a telephone number associated with the controller. Once this connection is established, the controller receives and

stores a first callback telephone number and a second callback telephone number as provided by the first party. Then the first connection is torn down by initiating conventional hang-up procedures. A second connection is re-established between the first party and the controller by operation of the controller to initiate a telephone call to the first callback telephone number. Then, a third connection is established between the second party and the controller by operation of the controller to initiate a telephone call to the second callback telephone number. Finally, the first party and the second party are bridged to allow conversation by coupling the second connection to the third connection.

US-A-5710809 describes a fixed line telecommunications system comprising a telecommunications node local to a calling location, a central switching unit associated with a called location, a conventional voice network and a data signalling channel external to the voice network linking the telecommunications node with the switching unit. A call from the calling location is received by the telecommunications node which transmits caller and called party identifications via the data signalling channel to the switching unit. The switching unit interrogates the called location by initiating a first call to the called location and, on answer from the called location, initiates a second phone call to the calling location via the voice network and the telecommunications node. Thereupon, the first and second calls are teleconferenced.

These, and other known callback methods, require the calling party to initiate a callback using a call to a network node, whether it is local or distant, which alone or in cooperation with other network nodes arranges the callback.

Summary of the Invention

5 According to one aspect of the present invention, there is provided apparatus for use in a mobile communications network, the apparatus comprising: means for receiving a callback request signal originated from a mobile station using a non-circuit-related data transfer mechanism, and calling means for establishing a first circuit connection with the mobile station in
10 response to the callback request signal.

According to another aspect of the present invention, there is provided a method of establishing a circuit connection between an apparatus in a mobile communications network and a mobile station, the method comprising: receiving a callback request signal originated from the mobile station using a non-circuit-related data transfer mechanism; and arranging a circuit connection from the apparatus to the mobile station in response to receipt of the callback request signal.
15

The use of a non-circuit-related data transfer mechanism has various advantages not available with the prior art methods, in which a voice call must
20 be placed in order to initiate a callback request.

The procedure for setting up a call may be more convenient and familiar to the user than that using a voice call for the callback request, since

the user may compose the message using only keyboard and graphical display interactions, similar to the more familiar forward direction call set up procedure, instead of participating in a preliminary call. The request may for example be generated by interaction with a menu facility on a display of the mobile station.

Furthermore, as the cost to the user, in particular when being served in a visited network, of the transmission from the mobile station of signals using a non-circuit-related data transfer mechanism is generally less than the cost of a circuit-based voice or data call for the same purpose, the invention provides means and methods for call establishment which are not only convenient but also more cost-effective to the user of the mobile station than prior art methods.

According to another aspect of the invention, there is provided a mobile station comprising: means for recognising a predetermined command entered by a user as a callback request command and for generating a callback request in response thereto; means for transmitting the generated callback request using a non-circuit-related data transfer mechanism; and means for receiving a circuit connection establishment request signal following transmission of the callback request.

This aspect of the invention is intended to provide further convenience to the user in using the callback service of the present invention, insofar as the mobile station is adapted to format information provided by the user as a

recognisable callback request when transmitted, without the need for the user to memorise or utilise the required message format.

Brief Description of the Drawings

Embodiments of the present invention will now be described, by way
5 of example only, with reference to the accompanying drawings, in which:

Figure 1 is a block diagram of a mobile communications network arranged in accordance with first and second embodiments of the invention;

Figure 2 illustrates a service node arranged in accordance with the first and second embodiments of the invention;

10 Figure 3 is a flow diagram illustrating steps carried out by the service node of Figure 2;

Figure 4 is a block diagram illustrating how USSD messages are handled in a first embodiment of the invention;

15 Figure 5 is a block diagram illustrating the operation of the first embodiment of the invention; and

Figure 6 is a block diagram illustrating the operation of the network in accordance with the second embodiment of the invention.

Detailed Description of the Drawings

Referring first to Figure 1, a Mobile Switching Centre (MSC) 2 is connected via communication links to a number of Base Station Controllers (BSCs) 4. The BSCs 4 are dispersed geographically across areas served by the Mobile Switching Centre 2. Each BSC 4 controls one or more Base

Transceiver Stations (BTSs) 6 located remote from, and connected by further communication links to, the BSC 4. Each BTS 6 transmits radio signals to, and receives signals from, mobile stations 8 which are in an area served by that BTS 6. The area is referred to as a "cell". A GSM network is provided 5 with a large number of such cells, which are ideally contiguous to provide continuous coverage over the whole network territory.

A Mobile Switching Centre 2 is also connected via communication links to other mobile switching centres in the remainder of the mobile communications system 10, which includes other GSM networks, in particular 10 GSM networks (having configurations similar to that illustrated) in other territories having roaming agreements with the illustrated network, and to a Public Service Telephone Network (PSTN), which is not illustrated. The Mobile Switching Centre 2 is provided with a Home Location Register (HLR) 12 which is a database storing subscriber data including the International 15 Mobile Subscriber Identity (IMSI) which is unique to each mobile station 8. The IMSI is also stored in the mobile station in a removable data store, referred to as a Subscriber Identity Module (SIM), along with other subscriber-specific information.

The Mobile Switching Centre 2 is also provided with a Visitor 20 Location Register (VLR) 14 which is a database temporarily storing subscriber data for mobile stations which are active in the area served by the Mobile Switching Centre 2.

The network additionally comprises a Service Node 24 which is connected, in a manner to be detailed below, to the MSC 2, the HLR 12 and a Short Message Service Centre (SMSC 18).

5 The storing and forwarding of SMS messages in the network is managed by a Short Message Service Centre (SMSC) 18. The SMSC 18 connected to MSC 2 is used in the second embodiment of the invention, and is directly or indirectly connected to the service node 24. The transmission of SMS messages from the MSC 2 to the service node 24 is relayed by the SMSC 18.

10 Figure 2 shows a schematic block diagram of the service node 24, incorporating the first and second embodiments of the invention. The service node 24 comprises a USSD Handler 71 and a Short Message Handler 72 for receiving USSD and SMS messages, respectively. The service node 24 also comprises a switch matrix 73. The switch matrix 73 terminates a large number of voice circuits 74 and is capable of accepting incoming voice calls, generating outgoing voice calls and cross-connecting different circuits. It is also capable of connecting voice calls to an Interactive Voice Response Unit (IVRU) 75. The IVRU 75, in turn, is capable of accepting DTMF signalling and playing recorded announcements, to conduct interactions with service 15 users.

20

The USSD Handler 71, the Short Message Handler 72, the switch matrix 73 and the IVRU 75 each are connected to a Service Node Control

Processor (SNCP) 76. The SNCP 76 is responsible for the processing service logic for supported services, the control of signalling and other interfaces, and the control of the Switch Matrix 73. The SNCP 76 illustrated is interfaced with a database 77 which contains on-board subscriber and service data.

- 5 Alternatively, the SNCP 76 may also use the services of an external Service Data Function.

In addition, the service node 24 also includes external interfaces 78, 79 for SS7 signalling, and Administration, Maintenance and Provisioning (OAM&P), respectively.

- 10 The operation of the service node 24 is now described in connection with the flow diagram of Figure 3.

At step 80, a callback request is received by either USSD Handler 71 or Short Message Handler 72. A callback request received by either of these interfaces is passed to the appropriate application in the SNCP 76.

- 15 At step 81, the SNCP 76 initiates a first outgoing call to the requesting subscriber using an available port of the Switch Matrix 73.

- At step 82, the SNCP 76 determines whether an identifiable recipient exists. If no such recipient identification has been received then the SNCP 76, at step 83, determines the required service through use of the IVRU 75. This 20 is achieved by connecting the voice circuit supporting a successful outgoing call to the subscriber to a port of the IVRU 75, instructing the IVRU 75 to

play appropriate announcements, and gathering and interpreting the subscriber's responses, which may be voiced and/or DTMF tones.

At step 84, the SNCP 76 determines whether the received service request is a third party call request or a request for a network service provided in the home network. In the latter case, the SNCP initiates a second outgoing call to the required service administration interface at step 85. If the service request is a third party call request, the SNCP 76 initiates a second outgoing call to the required third party number at step 86, using an available port of the switch matrix 73. On successful establishment of the second outgoing call 10 the SNCP 76 instructs the switch matrix 73 at step 87 to bridge the two associated call legs together, allowing two way communication between the subscriber and their chosen service or third party.

In the first embodiment of the invention, the GSM Unstructured Supplementary Service Data (USSD) data transfer mechanism is used. The 15 USSD data transfer mechanism is defined in, *inter alia*, the GSM Technical Specifications 02.90, 03.90 and 04.90 (published by the European Telecommunications Standards Institute). The USSD data transfer mechanism allows mobile subscribers to transmit user specified data to a network entity on the basis of unstructured message protocols. For example, a 20 mobile station can transmit text messages generated by the user via the station's man-machine interface (MMI) to a network entity to be processed by an associated application.

The USSD signalling between the network and the mobile station is performed in a transparent way, i.e. no review or manipulation of the user-specified contents of the USSD request is performed during transmission other than in the HLR application module. Using the USSD data transfer mechanism, a mobile station can communicate with a network entity without establishing a circuit connection and without requiring a dedicated two-way transmission channel. Rather, the signalling is performed through a non-circuit-related data transfer mechanism between the mobile station and the network, using a Stand-alone Dedicated Control Channel (SDCCH) in the radio interface.

According to the first embodiment of the invention, a subscriber who uses his mobile station in a roamed-to network, referred to in GSM as a Visited Public Land Mobile Network (VPLMN), can transmit a specially formatted USSD message from his mobile station to the subscriber's home network, referred to in GSM as the Home Public Land Mobile Network (HPLMN). This has the effect of initiating a first call from the HPLMN to the subscriber's mobile station, a second call from the HPLMN to a recipient party the subscriber wishes to call, and the first and second calls to be bridged.

Figure 4 illustrates how a USSD message originated by a mobile station 8a roaming in a VPLM is handled in accordance with this embodiment. The message is first passed to the serving MSC 21 in the VPLMN, on to the VLR 22 associated with that MSC, and via inter-network

links, to the subscriber's home HLR 12. The HLR passes the message to the callback service node 24 in the HPLMN. Each of the illustrated entities, i.e. mobile station 8a, MSC 21, VLR 22, HLR 12, and service node 24 comprises a USSD handler 25 to 29, respectively. Mobile station 8a comprises a Man-Machine Interface (MMI) 30 which allows the user to enter a USSD message into MS 8a. MMI 30 in turn is linked with the station's USSD handler 25.

Each of MSC 21, VLR 22 and HLR 12 comprises an application module 31 to 33, respectively. The application modules 31 to 33 in turn are linked with USSD handlers 26, 27 and 28, respectively. The USSD handlers examine a received USSD message to determine whether the message should be processed locally, or passed on to the next USSD handler in the chain, as defined in GSM Technical Specification 03.90, section 6. The application modules 31 to 33 are provided for processing a USSD message locally in the respective network entity. The location, nature and content of the USSD application modules is determined by the service provider and/or network operator.

The operation of the first embodiment is now described in connection with Figure 5.

If the subscriber using mobile station 8a wishes to initiate a call in accordance with the first embodiment, he first activates his mobile station 8a, and enters an alphanumeric character string, having a predetermined callback request format, by using the keys of mobile station 8a and instructs the

transmission thereof to the serving network. Alternatively, the mobile station may be adapted such that a correctly formatted USSD message can be created and sent by means of a dedicated callback menu facility on the mobile station.

For example, the SIM of the mobile station 8a may be provided with a prestored application program (e.g. a SIM Application Toolkit program, see

5 GSM Technical Specification 11.14) which is arranged to instruct the mobile station to provide one or more selectable menu options (e.g. "Voicemail Callback", "Third Party Callback", etc.), to allow user interaction in a selected menu option and to create and instruct the mobile station 8a to transmit a

10 USSD message which is correctly formatted in the predetermined callback request format. The user would thus select from menu options which are represented graphically on the display of the mobile station (e.g. "Third Party Callback"). The user may then be prompted to select from further menu options a desired prestored third party telephone number, or to enter the third

15 party telephone number by using the keyboard of mobile station 8a. The mobile station would then convert the entered information into the predetermined callback request format before transmission as a USSD message.

The USSD message also contains the actual user data, e.g. the

20 alphanumeric character string input by the user. The user data includes a predetermined character set and is arranged in a defined callback message format (for example including a predetermined character set in a

- predetermined part of the message) indicating that the message is to be passed to the service node 24. It also includes the Mobile Station International Directory Number (MSISDN, often referred to simply as the "directory number"). The MSISDN is included because the MSISDN is required to enable the home network to establish a return call to the calling subscriber in the visited network. Alternatively, the MSISDN may be omitted *since an appropriate MSISDN may be retrieved, with reference to the IMSI of the subscriber (which is generally included in the USSD signalling) of the subscriber, from the home HLR 12 by or on behalf of the service node 24.*
- 10 The user data may include data identifying the required service. This may identify a network service to be administered, in which case a service code unique to the service is included, or the establishment of a call to a third party, in which case the number of the third party to be called is included.
- Once the subscriber has entered the required information and the
15 USSD message has been transmitted from the mobile station 8a, the USSD message is transmitted via the radio interface and network elements of the visited network to the serving MSC 21. The MSC 21 then sets up a transaction to its associated VLR 22 and forwards the USSD request to the VLR 22 unchanged.
- 20 When the VLR 22 receives the USSD request, the VLR 22 checks, using the IMSI supplied in the USSD request whether the user is not in the HPLMN, as is the case for the scenario being considered. The VLR 22 then

sets up a transaction to the subscriber's home HLR 12 in the HPLMN and forwards the USSD request to the HLR 12 unchanged.

The message handler 28 in the HLR 12 passes the request to the service node 24. Finally, the service node 24 interprets the USSD request and initiates a call to the calling subscriber (as indicated by arrow 45). Depending on the content of the request, the service node 24 may also initiate a call to a recipient requested to be called (as indicated by arrow 47), and bridge the first and second calls (as indicated at 48). The recipient may be another mobile station 8b, a fixed line terminal 40 or a further service node 42 of the HPLMN, such as a voice mail retrieval system. Otherwise, the call may be handled in the service node 24.

The above transmission steps between the entities of the networks are transparent, i.e. the USSD messages are forwarded from one entity to another unchanged. No dedicated traffic channel (TCH) needs to be used. In other words, USSD messages do not require the end-to-end establishment of a traffic path. Also, USSD message transmission may take place even if the mobile station is already in full circuit communication. This aspect may be used to transmit a connection request to the service node 24 to conference in further parties to a call.

In the second embodiment of the invention, the Short Message Service (SMS) data transfer mechanism is employed. The SMS data transfer

mechanism is a data transfer teleservice defined in, *inter alia*, GSM Technical Specification 03.40.

The operation of the participating entities in accordance with the second embodiment is illustrated in connection with Figure 6. Figure 6 illustrates a mobile station 8a, a VPLMN MSC 21, the HPLMN SMSC 18, and the service node 24 in the mobile station's HPLMN. Similar to the operation in accordance with the first embodiment, if the subscriber using mobile station 8a wants to transmit a callback request, he activates his mobile station 8a, enters an SMS message, having a predetermined callback request format, by using the keys of mobile station 8a and transmits it to the unique destination address of the service node 24 in his home network. Alternatively, the mobile station may be adapted such that a correctly formatted SMS message can be created and sent by means of a dedicated callback menu facility on the mobile station. For example, the SIM of the mobile station 8a may be provided with a stored application program (e.g. a SIM Application Toolkit program) which is arranged to instruct the mobile station to provide one or more selectable menu options (e.g. "Voicemail Callback", "Third Party Callback", etc.), to allow user interaction in a selected menu option and to create and instruct the mobile station 8a to transmit an SMS message which is in the predetermined callback request format. The user would thus select from the menu options on the display of mobile station 8a, as described in connection with the first embodiment. The mobile station 8a then converts

the entered information into the predetermined callback request format, using the address of the service node 24 as the destination address of the message, before transmission.

5 The SMS message contains the subscriber's MSISDN number, to be used for the callback, as the originating address. The contained MSISDN is the subscriber's primary voice MSISDN; alternate line service MSISDNs are not supported in the current protocol. If an alternate line service MSISDN is preferred to be used for the callback, it may be specified in the user data content. If no MSISDN is included in the user data, the subscriber's primary
10 MSISDN is used as a default number for the callback.

The user data may include data identifying the required service. This may identify a network service to be administered, in which case a service code unique to the service is included, or the establishment of a call to a third party, in which case the number of the third party to be called is included.

15 Once the subscriber has entered the required information the SMS message is transmitted from the mobile station 8a via the radio interface and network elements of the visited network to the serving MSC 21. The MSC 21 forwards the short message to the home network SMSC 18, which in turn forwards it to the short message handler of the service node 24. Finally, the
20 service node 24 parses the callback request, initiates a first outgoing call to the subscriber's mobile station 8a as indicated by arrow 64, and if appropriate initiates a second outgoing call to a recipient party to be called as indicated by

arrow 65, and bridges the first and second outgoing calls as indicated at 66. The recipient may be another mobile station 8b, a fixed line terminal 40 or a further service node 42 of the HPLMN, such as a voice mail retrieval system. Otherwise, the call may be handled in the service node 24.

5 SMS messages do not require the end-to-end establishment of a traffic path. Also, short message transmission may take place even if the mobile station is already in full circuit communication. This aspect allows a user to transmit a connection request to the service node 24 to teleconference in further parties to a call.

10 It should be noted that the present invention is not limited to the embodiments as described above.

For example, the service node 24 need not be configured to handle callback requests in the form of both USSD and SMS message, but may handle only one type of non-circuit-related data transfer mechanism.

15 The invention is not limited to the non-circuit-related data transfer mechanisms exemplified (i.e. USSD and SMS). Indeed, the invention is not limited to the GSM standard but may be used in other systems in which subscribers may roam from one network to another.

20 It is envisaged that various other modifications and variations to the above described embodiments could be made without falling outside the scope of the invention as determined from the claims.

CLAIMS:

1. Apparatus for use in a mobile communications network, the apparatus comprising means for receiving a callback request signal originated from a mobile station using a non-circuit-related data transfer mechanism, and calling means for establishing a first circuit connection with the mobile station in response to the callback request signal.
2. The apparatus of claim 1, wherein the callback request signal comprises an alphanumeric message.
3. The apparatus of claim 1 or 2, wherein when the apparatus is arranged in a first mobile communications network it is capable of receiving said callback request signal while the mobile station is receiving service in a second mobile communications network.
4. The apparatus of claim 3, wherein the first network is the home network of the mobile station, and the second network is a visited network in which the mobile station has roaming status.

5. The apparatus of any preceding claim, wherein the calling means is arranged to establish a second circuit connection with a recipient, and to bridge the first and second circuit connections.
- 5 6. The apparatus of claim 5, wherein the callback request signal comprises a telephone number of a third party.
- 10 7. The apparatus of any preceding claim, wherein the callback request signal comprises data identifying a network service to which a circuit connection is to be provided by the apparatus, such as an answerphone service.
- 15 8. The apparatus of any preceding claim, wherein the callback request signal is transmitted from the mobile station via a Stand-alone Dedicated Control Channel (SDCCH).
9. The apparatus of any preceding claim, wherein the callback request signal comprises a data transfer teleservice signal.
- 20 10. The apparatus of claim 9, wherein the callback request signal comprises a Short Message Service (SMS) message.

11. The apparatus of any of claims 1 to 8, wherein the callback request signal comprises an Unstructured Supplementary Service Data (USSD) message.

5 12. The apparatus of any preceding claim, wherein the callback request signal comprises data identifying the mobile station.

10 13. A method of arranging a circuit connection using a mobile station receiving service in a first mobile communications network, the method comprising:

generating a callback request in said mobile station in response to user input;

15 transmitting said callback request from said mobile station using a non-circuit-related data transfer mechanism, such that said request is forwarded by said first network to a second network; and

subsequently receiving at said mobile station a circuit connection establishment request, originated in said second network, from said first network.

20 14. A method of establishing, in a first mobile communications network, a circuit connection with a mobile station receiving service in a second mobile communications network,

- said method including receiving in said first network a callback request signal, originated from said mobile station using a non-circuit-related data transfer mechanism, from said second network; and
- transmitting from said first network a circuit establishment request to
5 said mobile station via said second network.

15. A method of establishing a circuit connection between an apparatus in a mobile communications network and a mobile station, the method comprising:
- 10 receiving a callback request signal originated from the mobile station using a non-circuit-related data transfer mechanism; and
- arranging a circuit connection from the apparatus to the mobile station in response to receipt of the callback request signal.
- 15 16. A mobile station comprising:
- means for recognising a predetermined command entered by a user as a callback request command and for generating a callback request in response thereto;
- means for transmitting the generated callback request using a non-
20 circuit-related data transfer mechanism; and
- means for receiving a circuit connection establishment request signal following transmission of the callback request.

17. The mobile station of claim 16, wherein said recognising and generating means comprises a dedicated callback menu facility.

5 18. Apparatus, or a method, substantially as hereinbefore described, in particular with reference to Figures 1 to 6.



Application No: GB 9822108.8
Claims searched: 1 to 18

Examiner: Glyn Hughes
Date of search: 9 February 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): H4L (LDPP, LECX), H4K (KF42)

Int Cl (Ed.6): H04Q 7/22, 7/32, H04M 3/42, 3/48

Other: Online: WPI, PAJ, EPODOC

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	WO 98/09463 A2 (QUALCOMM) see whole document	-
A	WO 96/20572 A1 (ERICSSON) see whole document	-

- | | | | |
|---|---|---|--|
| X | Document indicating lack of novelty or inventive step | A | Document indicating technological background and/or state of the art. |
| Y | Document indicating lack of inventive step if combined with one or more other documents of same category. | P | Document published on or after the declared priority date but before the filing date of this invention. |
| & | Member of the same patent family | E | Patent document published on or after, but with priority date earlier than, the filing date of this application. |



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 1 195 975 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
10.04.2002 Bulletin 2002/15

(51) Int Cl. 7: H04M 3/493

(21) Application number: 01308098.1

(22) Date of filing: 24.09.2001

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR

Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 25.09.2000 GB 0023463

(71) Applicant: INTELLPROP LIMITED
Guernsey, Channel Islands (GB)

(72) Inventor: Wilson, Jeffrey
Fareham, Hampshire PO16 7OH (GB)

(74) Representative: Pillich, Adam John Michael
D. YOUNG & CO.,
21 New Fetter Lane
London EC4A 1DA (GB)

(54) Call setup by translating a text message into telephone number

(57) Services apparatus for use with a mobile telephone system provides a dialling system providing simplified access to services or other terminals. A dialling decoder and database receives a text message from a mobile station MS and identifies the text message as a request for call connection to a telephone number as-

sociated with the text message. A call connection system outdials to that telephone number and also to the mobile station MS, and connects the two calls. An identification signal characteristic of the telephone number of the mobile station MS is also sent to the telephone number associated with the received text message.

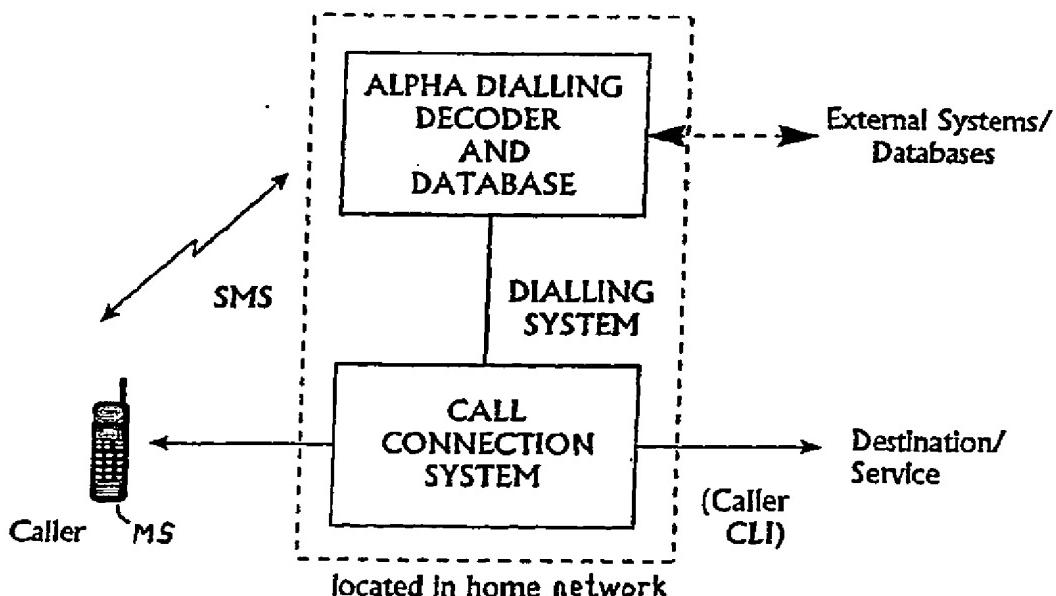


Figure 1.

Description

- [0001] This invention relates to a telecommunications services apparatus for use with a mobile telecommunications system, such as a mobile telephone system.
- 5 [0002] Users of mobile telephones can have access to a wide variety of voice services, including network-based services such as voicemail and information/entertainment services such as live radio feeds.
- [0003] Normally, users access these services by originating a call to the service delivery equipment by dialling a string of digits representing the telephone number of the service. Most people have difficulty memorising more than a few telephone numbers and therefore use various forms of directory to provide a translation from meaningful alphanumeric name to digit string.
- 10 [0004] In the case of mobile telephone users, the directory or 'phonebook' contained within the handset is most useful. However if a service is called infrequently the user may not have stored the number, either because of capacity limitations or because future use was not foreseen. Later, when the service is required, obtaining the number from other sources may be difficult, especially if the user is away from home or office.
- 15 [0005] In another branch of communications, the same problem of using long digit strings to identify Internet websites has been very effectively overcome by allowing users to enter alphanumeric addresses (domain names) of the form "www.companyname.com". Such addresses are translated within the Internet network to the required numeric strings. Furthermore, Internet search engines are available so that when a user cannot remember or does not know the required domain name, an approximation or keyword can be entered to enable intelligent identification of potentially desired websites.
- 20 [0006] It would be highly desirable if a similar scheme were available to enable access to telephone services via alphanumeric addresses.
- [0007] Some attempts to overcome this problem have been made with personal numbers and particularly freephone numbers. For example, generic identifiers in the UK such as 0800 FLOWERS are used to route calls to a specific florist, or (with Intelligent Network number translation facilities) to the florist nearest to the caller. Specific identifiers, such as 0800 TELSISS, can be dialled to reach a particular company or organisation.
- 25 [0008] In such cases, the organisation 'owning' the alphanumeric address has in fact 'bought' a telephone number where the digits correspond to the letters usually printed on a telephone keypad. Thus 0800 TELSISS is actually 0800 835747. A drawback of this approach is that, because each of the digit keys represents several letters, other organisations may not be able to use the same scheme - for example 0800 VEKRIS is also 0800 835747. Thus utilisation of the significantly increased address space offered by alphanumeric addressing is severely limited.
- 30 [0009] Other drawbacks of the '0800 TELSISS' approach include the fact that a number of different layouts for letters on telephone keypads are in use throughout the world. Whilst the situation has been eased in recent times with the introduction of an ISO standard, organisations may still have to promote both alpha and numeric telephone numbers, e.g. '0800 TELSISS (835747)'.
- 35 [0010] In addition, callers who are not in the 'home' country have difficulty in accessing such numbers. For example, somebody in the Netherlands wishing to call Telsis in the UK would normally have to dial the international access code, followed by the country code and then the UK telephone number (without the leading zero), i.e. 0044 800 TELSISS. This means that the caller would have to know where Telsis is located and the appropriate country code and number format.
- 40 [0011] Even if these are known, access is unlikely to be permitted because 0800 is a freephone code and, even where networks allow it, the organisation may not wish to accept the charges resulting from international calls.
- [0012] An attempt to overcome these difficulties and restrictions has been made through introduction of the Universal Freephone service in which a logical country code of 800 has been allocated. Thus dialling 00 800 00 TELSISS could allow access to Telsis from any country supporting the Universal Freephone service, but in practice the organisation has to arrange for the particular Universal Freephone number to be activated in every country from which it is prepared to accept calls. The points made above regarding name/number clashes (TELSIIS/VEKRIS) and inefficient use of the potential address space are still valid for Universal Freephone, and in addition the caller must remember the exact number format, i.e. 00 800 00 in this case.
- 45 [0013] As can be seen, numeric numbering schemes within the world's telecoms networks are inherently restrictive, resulting in an impaired service to users and reduced network revenues. The restrictions could be overcome with a means to easily use alphanumeric addressing.
- 50 [0014] As discussed above, it is possible to use alphanumeric representations of telephone numbers but with significant limitations.
- 55 [0015] Mobile telephones typically have a directory of 'phonebook' facilities which enable telephone numbers and appropriate alphanumeric identifiers to be stored within the handset. As discussed, these have limited capacity and a required telephone number may not be stored.
- [0016] It is normally possible to store a single number which can access a service or destination from any country.

For example, (unlike a call from the fixed network) +44 1489 885877 will reach the required destination whether the call is made from within the UK or overseas. However should the number change, e.g. through a national code change, then the user will have to edit the mobile handset phonebook entry.

[0017] Mobile handsets have another facility which can be used to overcome some of these limitations - the Short Message Service (SMS) forming part of the GSM standard enables alphanumeric text messages to be sent to a destination. This destination can be a system including a database which can provide information in response to a query.

[0018] For example, the SMS text 'TRAINs' could be sent - the system would reply by sending a message such as 'Train Enquiries on 08457 484950' back to the handset. In another example the SMS text 'TAXIS FAREHAM' could be sent - the mobile handset would then receive an SMS reply providing a list of taxi companies in the Fareham area, together with their phone numbers.

[0019] The mobile phone user can then call a selected number, either by keying in the number again or by using the 'Use Number' facility available in some handsets which enables extraction of numbers from SMS messages for immediate use in dialling.

[0020] A disadvantage of this approach is that it may not allow simple, straightforward use when roaming - it may be necessary for the mobile user to include the international access code and country code and to remove the leading digit of the number, for example. A situation where this might arise is with an international traveller wishing to arrange for a local taxi company to collect him from the airport when he arrives home. The standard taxi number service would use national telephone numbers rather than international, so as not to confuse the majority of users.

[0021] Another example of the limitation of this facility is in accessing services which are normally reached by dialling a short code when connected to the home network. Such services may include voicemail, customer services, and information/entertainment services. Current limitations of mobile networks with respect to international call handling mean that, in the majority of cases, calls to a short code are not passed through the international gateway.

[0022] Furthermore, current limitations of international call handling mean that the caller's CLI is often not delivered to a destination. This can restrict access to certain services and destinations.

[0023] According to the invention there is provided a telecommunications services apparatus for use with a mobile radio telecommunications system, said apparatus comprising:

a text message decoder for receiving a text message from a mobile station of the mobile radio telecommunications system, and for identifying the received text message as a request for call connection to a telephone number associated with the received text message; and
 a call connection means for outdialling to said telephone number associated with the received text message and to said mobile station, and for connecting said telephone number and said mobile station, said call connection means also sending an identification signal characteristic of the telephone number of said mobile station to said telephone number associated with the received text message.

[0024] Preferably, the text message decoder includes a database linking text identifiers with respective telephone numbers. Means may be provided for accessing at least one external database linking further text identifiers with respective further telephone numbers. The call connection means may be operable to connect the calling mobile station to the respective voice mailbox provided by the system.

[0025] The invention will now be described by way of example with reference to the accompanying drawings, throughout which like parts are referred to by like references, and in which:

Figure 1 is a block diagram of a telecommunications services apparatus in accordance with an embodiment of the invention, comprising an alpha dialling system;

Figure 2 is a block diagram showing a network configuration of the dialling system; and

Figure 3 is a diagram showing a possible database structure.

[0026] Referring to Figure 1, there is shown a dialling system comprising a call connection system CCS and an alpha dialling decoder and database ADDD. The call connection system provides communication with a mobile station (caller) MS, and with a destination/service.

[0027] The mobile user compiles an SMS text message which merely comprises an identifier for the required service. The message is sent via the normal mobile telephone network to the ADDD. This system performs a database look-up to obtain a telephone number which corresponds to the text identifier. The ADDD sends this number (which represents the destination), together with the Calling Line Identity of the mobile handset which sent the SMS text, to the CCS. The CCS dials out to the mobile (which may be anywhere in the world where there is a roaming arrangement with its home network) and, once connected, dials out to the destination number. The two call legs are connected together within the CCS so that the mobile user is connected to the required destination or service. To ensure that the called party or system is aware of who's calling, the CCS establishes the outdialled call to the destination or service

with the CLI (Calling Line Identity) of the caller.

[0028] In this way, the user merely has to enter an identifier for the required service and send it by SMS to the dialling system, the access number for which may be a memorable short code or even a single number stored within the mobile stations phonebook. Everything else involved in connecting the caller to the required service is fully automatic.

5 [0029] It is anticipated that the dialling system is located in the user's home network as this would readily enable connection to services normally accessed by short codes within the home network.

[0030] Examples of usage of the dialling system may include:

10	RADIO4 CRICKET VM (or VOICEMAIL)	connects to a live feed of BBC Radio 4 connects to a service providing latest cricket scores Connects to the user's voicemail system, which may be particularly useful overseas when a short access code is not available
15	CS (or CUSTOMER SERVICE or HELP) RAC TELSIS BOSCH DISHWASHER	connects to the home network operator's customer service centre connects to a motoring organisation connects to organisation connects to appropriate help desk within company for specified product support
20	ARCHERS HOME	connects to a time-shifted recording of a favourite radio programme connects to the user's home (with the benefit that CLI is passed on)

[0031] Use of the dialling system may be charged for in a number of ways. In normal circumstances the caller would pay for the SMS text transmission. The network operator may wish to charge for both call legs (i.e. back to the mobile and onward to destination) or only one call leg depending upon the type of service accessed. Furthermore, the call may be charged to the mobile user or to the destination, or to a combination. All of the information required for billing is provided by the CCS including the CLI of the caller.

[0032] The database within the ADDD may contact multiple entries for the same service. For example,

30 RADIO4
RADIO 4
R4
BBC RADIO4
BBC RADIO 4
BBC R4

35 may all point to the same service, and the ADDD may also incorporate intelligent text analysis so that other forms of the same request could be understood.

[0033] The system may generate service usage statistics such as information regarding the number of calls to particular services and the text identifiers used to access them. In addition, the system can report all text identifiers for 40 which there is no entry in the database. This will enable the network operator or service provider to determine whether alternative text identifiers need to be added to the database to enable access to existing services, or whether there is a demand for additional services.

[0034] In addition, it is anticipated that the dialling system may support 'intelligent interaction' to assist the user 45 gaining access to services. For example, the user may send the identifier 'RADIO FOUR', which may not be in the database. In-built intelligence would determine that the 'FOUR' could be represented by '4' and the system would send an SMS message back to the user with contents of the form

RADIO FOUR is not recognised. Do you require RADIO 4 ?

If so, just reply to this message without changing the contents.

[0035] The re-transmitted message would be identified and the user connected to the appropriate service just as if 50 they had sent 'RADIO 4'.

[0036] These facilities enable maximisation of service availability and system usage, with consequent customer satisfaction and revenue generation.

[0037] System usage can also be monitored on an individual user basis, and this may enable the system to build up preference lists so that personal services can be offered.

55 [0038] Indeed, it is envisaged that the system supports personalisation at the network level (for example, UK BT Cellnet customers may have their VM or VOICEMAIL entry translated to 901 or 902 depending upon whether they use standard voicemail or 'voicemail plus').

[0039] In addition, the user is able to set up their own personal database entries, such as HOME. This enables users to take advantage of the system's ability to deliver CLI even when the user is roaming on a foreign network - overcoming the problem of not being able to call home (or other destinations) because calls are either automatically or manually rejected because no CLI is presented.

5 [0040] Alphanumeric identifiers and the telephone numbers to which they translate may be held either in the ADS database or in an external system or database. Typically, when an SMS message is received with an identifier, the user's 'personal' database entries are searched first and if no match is obtained the 'network' database is checked.

[0041] Typically, the user submits personalised database entries to the system using SMS, but a variety of other methods are possible, including

- 10 - manually, via a customer services agent
- via a web interface
- via WAP (Wireless Application Protocol) messaging
- via email
- 15 - via an interactive voice service

[0042] Figure 2 shows a mobile station MS(1) communicating with a network comprising a base transceiver station BTS (2), a mobile switching centre MSC (3) and a short message service centre SMS-C (4). The network communicates via the Mobile Application Protocol MAP with a dialling system (9) embodying the invention. The dialling system (9) includes a transaction converter (5), an alpha dialling controller (6), a database (7) and a switch block (8). The switch block (8) provides communication to a selected external telephone (10) or service. The controller (6) may be connected to external systems and/or databases, as shown.

20 [0043] In Figure 2, the mobile user having the mobile station (1) wishes to listen to a time shifted copy of the most recent episode of The Archers radio programme and so sends the SMS message "ARCHERS" to the dialling system (9). The text message is received by the base transceiver station (3). This is passed to the SMS-C (4), which sends an SMS message in a MAP message to the transaction converter (5) via the MSC (3).

[0044] The transaction converter (5) extracts the contents and passes them to the alpha dialling controller (6).

[0045] In the preferred embodiment, the controller (6) uses a hashing algorithm to locate the position of the word "ARCHERS" in the database (7). A possible database structure is shown in Figure 3. This provides the telephone number for the ARCHERS service and the billing category. Other search algorithms and implementations of the database are possible.

[0046] The dialling controller (6) now passes the user's CLI (attached to the SMS message), the service telephone number and the billing category to the switch block (8). The switch block (8) then makes two outdial telephone calls, one to the user (8, 3, 2, 1) and another to the ARCHERS service (8, 10).

35 [0047] The type of billing will be determined by the billing category. Likely billing categories are (1) User pays for both calls, (2) Called party pays for both calls or (3) the mobile network pays for both calls (free network services). In some circumstances the billing may be shared by the different parties. In one case, whitelists may be used so that billing is not only service dependent but also dependent upon the CLI of the caller.

[0048] In the system diagram of Figure 2, the service (10) is shown as a fixed line telephone. In practice, this may 40 be an automatic service providing the audio source (for example, the time shifted Archers episode). It could also be a mobile telephone.

Claims

45 1. A telecommunications services apparatus for use with a mobile radio telecommunications system, said apparatus comprising:

50 a text message decoder for receiving a text message from a mobile station of the mobile radio telecommunications system, and for identifying the received text message as a request for call connection to a telephone number associated with the received text message; and
55 a call connection means for outdialling to said telephone number associated with the received text message and to said mobile station, and for connecting said telephone number and said mobile station, said call connection means also sending an identification signal characteristic of the telephone number of said mobile station to said telephone number associated with the received text message.

2. Apparatus according to claim 1, wherein the text message decoder includes a database linking text identifiers with respective telephone numbers.

EP 1 195 975 A2

3. Apparatus according to claim 1 or claim 2, including means for accessing at least one external database linking further text identifiers with respective further telephone numbers.
4. Apparatus according to claim 1, claim 2 or claim 3, wherein the call connection means is operable to connect the mobile station to the respective voice mailbox provided by the mobile radio telecommunications system.

10

15

20

25

30

35

40

45

50

55

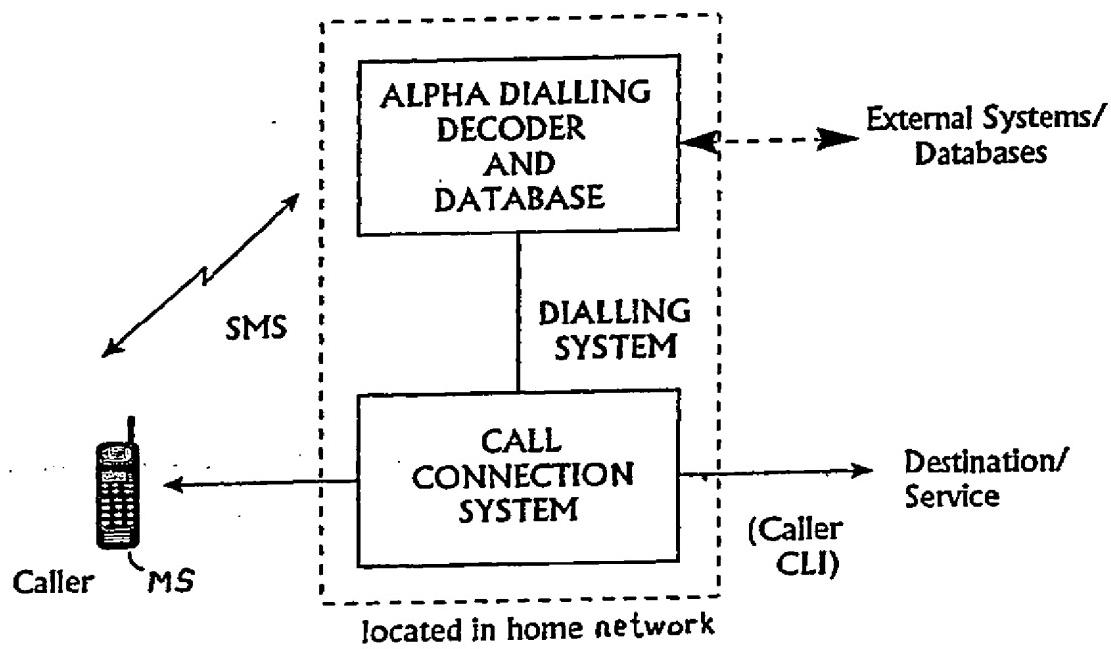


Figure 1.

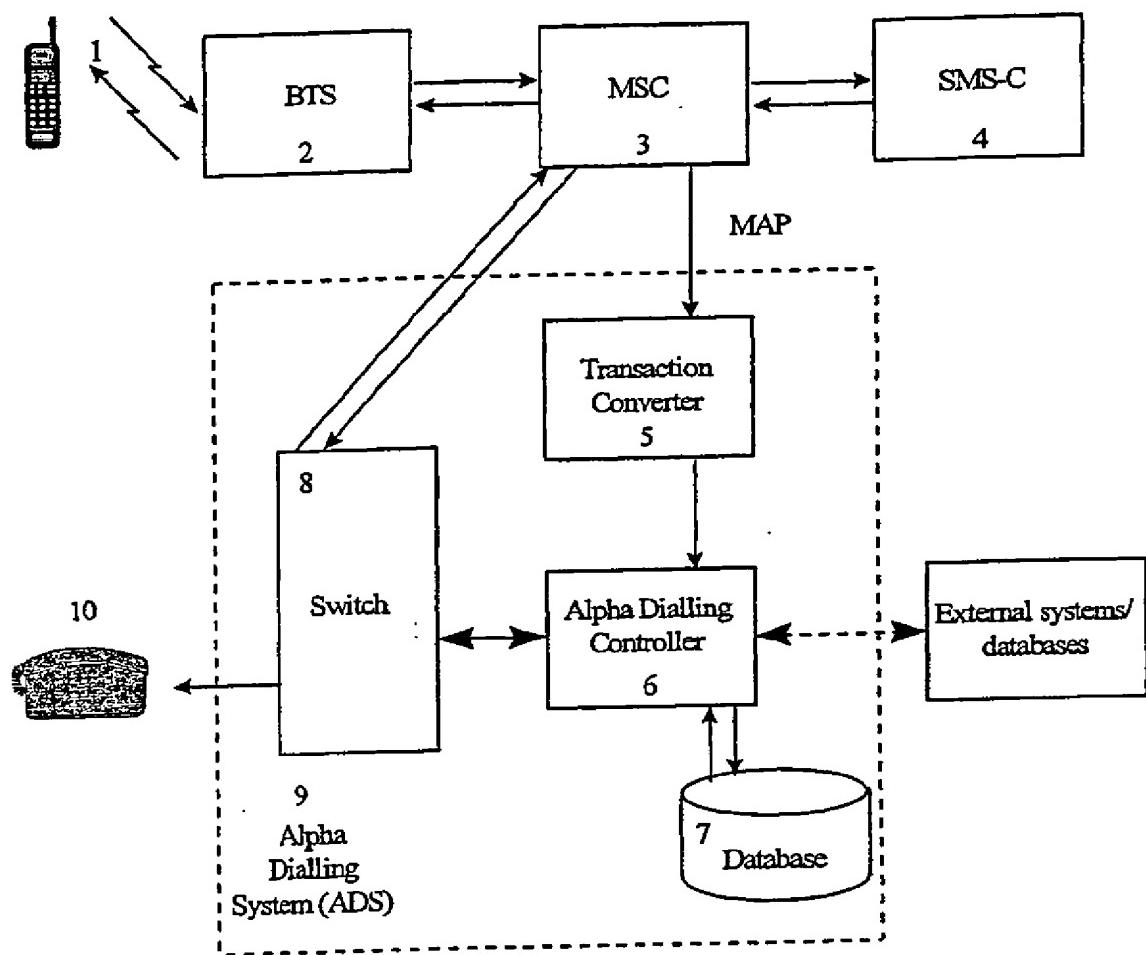


Figure 2

Key word	Phone No.	Billing Category
CRICKET	+441111222333	1 (Caller pays)

ARCHERS	+441234567890	1 (Caller pays)

RADIO4	+442211334455	1 (Caller pays)

COMPANYNAME	+442222112233	2 (Called party pays)

Figure 3



(19) Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) EP 1 195 975 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3:
20.04.2005 Bulletin 2005/16

(51) Int Cl.7: H04M 3/493

(43) Date of publication A2:
10.04.2002 Bulletin 2002/15

(21) Application number: 01308098.1

(22) Date of filing: 24.09.2001

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE TR

Designated Extension States:
AL LT LV MK RO SI

(30) Priority: 25.09.2000 GB 0023463

(71) Applicant: INTELLPROP LIMITED
Guernsey, Channel Islands (GB)

(72) Inventor: Wilson, Jeffrey
Fareham, Hampshire PO16 7OH (GB)

(74) Representative: Pilch, Adam John Michael
D Young & Co
120 Holborn
London EC1N 2DY (GB)

(54) Call setup by translating a text message into telephone number

(57) Services apparatus for use with a mobile telephone system provides a dialling system providing simplified access to services or other terminals. A dialling decoder and database receives a text message from a mobile station MS and identifies the text message as a request for call connection to a telephone number as-

sociated with the text message. A call connection system outdials to that telephone number and also to the mobile station MS, and connects the two calls. An identification signal characteristic of the telephone number of the mobile station MS is also sent to the telephone number associated with the received text message.

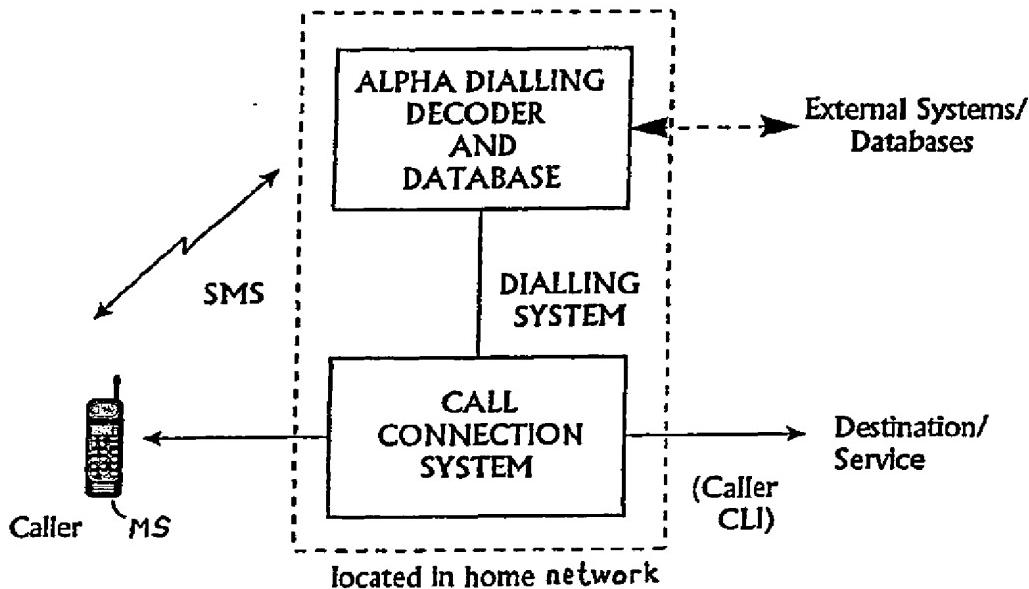


Figure 1.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 01 30 8098

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	WO 99/66702 A (SONERA OYJ; LAHTINEN, PASI) 23 December 1999 (1999-12-23) * page 2, line 25 - page 3, line 4; figure 3 *	1-4	H04M3/493
X	----- GB 2 342 536 A (* ORANGE PERSONAL COMMUNICATIONS SERVICES LIMITED) 12 April 2000 (2000-04-12) * page 15, line 3 - page 17, line 9; figure 6 *	1-4	
Y	----- DE 198 36 343 A1 (SIEMENS AG) 17 February 2000 (2000-02-17) * column 1, lines 33-47 * * column 3, lines 25-36 *	1-4	
Y	----- US 4 959 855 A (DAUDELIN ET AL) 25 September 1990 (1990-09-25) * column 1, line 25 - column 2, line 10 *	1-4	
A	----- DE 195 15 856 A1 (ALCATEL SEL AG, 70435 STUTTGART, DE) 31 October 1996 (1996-10-31) * column 1, line 68 - column 2, line 11 * * column 3, line 52 - column 4, line 1 * * column 4, line 61 - column 5, line 8 *	1-4	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	----- "Q.951: Stage 3 Description for Number Identification Supplementary Services using DSS1" ITU-T RECOMMENDATION Q.951, XX, XX, March 1993 (1993-03), pages 1-9, XP002318432 * paragraph 3.3.2 Requirements on the originating network side *	1	H04M
The present search report has been drawn up for all claims			
3	Place of search Munich	Date of completion of the search 21 February 2005	Examiner Cremer, J
EPO FORM 1503 08.62 (P04/C01)	CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document	T: theory or principle underlying the invention E: earlier patent document, but published on, or after the filing date D: document cited in the application L: document cited for other reasons & : member of the same patent family, corresponding document	

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 8098

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

21-02-2005

Patent document cited in search report		Publication date		Patent family member(s)		Publication date
WO 9966702	A	23-12-1999	FI	981369 A	13-12-1999	
			AU	4784299 A	05-01-2000	
			CN	1310910 T	29-08-2001	
			DE	1088439 T1	05-07-2001	
			EP	1088439 A1	04-04-2001	
			ES	2155050 T1	01-05-2001	
			WO	9966702 A1	23-12-1999	
			US	2001002364 A1	31-05-2001	
GB 2342536	A	12-04-2000	AU	6214899 A	01-05-2000	
			EP	1118240 A1	25-07-2001	
			WO	0022863 A1	20-04-2000	
DE 19836343	A1	17-02-2000	WO	0010315 A1	24-02-2000	
US 4959855	A	25-09-1990	CA	1291550 C	29-10-1991	
			DE	3777829 D1	30-04-1992	
			EP	0321498 A1	28-06-1989	
			JP	2500073 T	11-01-1990	
			JP	3079909 B	20-12-1991	
			WO	8802965 A1	21-04-1988	
DE 19515856	A1	31-10-1996	AU	5811896 A	21-11-1996	
			WO	9635296 A1	07-11-1996	



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : H04M 3/42		A1	(11) International Publication Number: WO 99/66702 (43) International Publication Date: 23 December 1999 (23.12.99)
<p>(21) International Application Number: PCT/FI99/00514</p> <p>(22) International Filing Date: 11 June 1999 (11.06.99)</p> <p>(30) Priority Data: 981369 12 June 1998 (12.06.98) FI</p> <p>(71) Applicant (<i>for all designated States except US</i>): SONERA OYJ [FI/FI]; Teollisuuskatu 15, FIN-00510 Helsinki (FI).</p> <p>(72) Inventor; and</p> <p>(75) Inventor/Applicant (<i>for US only</i>): LAHTINEN, Pasi [FI/FI]; Aittatie 1 A 3, FIN-00390 Helsinki (FI).</p> <p>(74) Agent: PAPULA REIN LAHTELA OY; Fredrikinkatu 61 A, P.O. Box 981, FIN-00101 Helsinki (FI).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, WIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published</p> <p><i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments. In English translation (filed in Finnish).</i></p>	
<p>(54) Title: PROCEDURE AND SYSTEM FOR SETTING UP A TELECOMMUNICATION CONNECTION</p> <p>(57) Abstract</p> <p>Procedure and system for setting up a call between a calling subscriber located in country (C1) and a called subscriber located in another country (C2), in a telecommunication system which comprises two telecommunication terminals, a telecommunication network and a telecommunication server. In the procedure and system of the invention, the calling subscriber sends a call setup message to the telecommunication server in the telecommunication network, the telecommunication server sets up a telecommunication connection to the calling subscriber and another telecommunication connection to the called subscriber, and the telecommunication server connects the two telecommunication connections so that a telecommunication connection from the called subscriber to the calling subscriber is established.</p>			

```

graph TD
    21[User keys in a call setup message on his/her mobile station.] --> 22[User sends call setup message to telecommunication server]
    22 --> 23[Telecommunication server receives Call setup message. Message OK?]
    23 -- No --> 24[Notice to user.]
    23 -- Yes --> 25[Telecommunication server determines B-subscription based on call setup message.]
    25 --> 26[Telecommunication server identifies A-subscription.]
    26 --> 27[Telecommunication server directs charge to A-subscription.]
    27 --> 28[Server sets up a call to A-party's number and another call to B-party's number.]
    28 --> 29[Server connects the calls so that a call from B-party to A-party is established.]
  
```

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece	ML	Mali	TR	Turkey
BG	Bulgaria	HU	Hungary	MN	Mongolia	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MR	Mauritania	UA	Ukraine
BR	Brazil	IL	Israel	MW	Malawi	UG	Uganda
BY	Belarus	IS	Iceland	MX	Mexico	US	United States of America
CA	Canada	IT	Italy	NE	Niger	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NL	Netherlands	VN	Viet Nam
CG	Congo	KE	Kenya	NO	Norway	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NZ	New Zealand	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	PL	Poland		
CM	Cameroon	KR	Republic of Korea	PT	Portugal		
CN	China	KZ	Kazakhstan	RO	Romania		
CU	Cuba	LC	Saint Lucia	RU	Russian Federation		
CZ	Czech Republic	LI	Liechtenstein	SD	Sudan		
DE	Germany	LK	Sri Lanka	SE	Sweden		
DK	Denmark	LR	Liberia	SG	Singapore		
EE	Estonia						

PROCEDURE AND SYSTEM FOR SETTING UP A TELECOMMUNICATION CONNECTION

FIELD OF THE INVENTION

The present invention relates to a procedure
5 as defined in the preamble of claim 1 and to a system
as defined in the preamble of claim 5 for setting up a
call between subscribers located in two different
countries.

10 BACKGROUND OF THE INVENTION

The prices charged by telephone operators in
different countries vary considerably. Operators'
pricing policies often lead to a situation where a
call between two countries is clearly cheaper if set
15 up in the reverse direction. In such a case, it is
cheaper to make a call e.g. from Finland to Central
Europe than from Central Europe to Finland. Doubtless
the most frequently used method is to make a brief
call to Finland and ask the called party to call back
20 immediately. Another method is to call a telephone or-
der service provided by the operator in which a person
answering the call calls back the A-party and connects
the call to the B-party's number. Other methods used
are e.g.

25 - phone cards by means of which the A-party
can call an Automatic Telephone service System (ATS)
and, using tone frequency selections, order callback
to the B-party's number;

30 - automatic CallBack machine, which calls
back the A-party and the A-party gives billing infor-
mation and the B-party's telephone number; and

- Telecard service, in which a call to a num-
ber beginning with 0800 is connected to a Finnish op-
erator.

35 Each of the above-mentioned methods has cer-
tain drawbacks. E.g. in the Telecard service, calls

are charged to the B-party, the initial charge is high and the operator must acquire a 0800-number in each country where the service is to be provided. Other problems arise because calling line identification can
5 not always be successfully carried out in the case of calls made from abroad, changing passwords are needed or the desired number has to be input via tone frequency selection (e.g. ATS). In addition, in automatic systems and telephone order services, the call is set
10 up by first calling the number of the system or service, thus increasing the cost. It is only after this that a cheaper call back to the A-party can be established.

15 BRIEF DESCRIPTION OF THE INVENTION

The procedure of the invention is characterized by what is presented in claim 1 and the system of the invention by what is presented in claim 5.

20 The system of the invention comprises an A-party's telecommunication terminal, e.g. a GSM telephone, a B-party's telecommunication terminal, e.g. a mobile station or a wired-network telephone, and a telecommunication server provided with means for handling calls and messages.

25 In the procedure of the invention, a telephone connection is set up between an A-party located in country C1 and a B-party located in another country C2. In the procedure, the A-party sends from his/her telecommunication terminal a call setup message to a
30 telecommunication server connected to the mobile subscriber network. From the call setup message, the telecommunication server identifies the B-party's telephone number. The telecommunication server sets up a call to the A-party and another call to the B-party
35 and connects the two calls so that a call is established from the B-party to the A-party. Further, in the procedure of the invention, the telecommunication

server identifies the A-party's subscription and directs the charge for the call to that subscription. The call setup message is e.g. a short message (SMS, Short Message Service) or an USSD message.

5 The procedure and system of the invention make it possible to achieve a quick and easy change of call setup direction. For a call that has been set up according to the invention, the only expenses are those arising from sending the message and from the
10 actual call. In particular, the procedure and system of the invention allow easy input of the called number as this can be done directly on a GSM telephone before setup of the actual call, instead of e.g. via tone frequency selection during a call. In addition, the
15 procedure and system of the invention identify the A-subscription, allowing the call to be charged to that subscription. In the system of the invention, user identification is as safe as in the GSM system at present.

20

LIST OF ILLUSTRATIONS

In the following, the invention will be described in detail by the aid of a few examples of its embodiments, wherein

25 Fig. 1 presents a system according to the invention;

Fig. 2 presents a functional block diagram representing the procedure of the invention; and

30 Fig. 3 presents a signalling diagram for the system of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The system presented in Fig. 1 comprises an A-party's telecommunication terminal 1, which is e.g.
35 a GSM telephone or a corresponding mobile station, a

B-party's telecommunication terminal 2, which is a mobile station or a wired-network telephone, a mobile communication system 3 and a telecommunication server 4 connected to it and provided with means for handling 5 messages and calls.

In the procedure of the invention, an A-party 1 inputs a call setup message 5 on his/her mobile station, Fig. 2, block 2. The call setup message 5 contains the number of the B-party 2 with whom a telephone connection is to be established. The A-party 1 sends the call setup message 5 from his/her mobile station to the telecommunication server 4, block 22. If the transmission was unsuccessful, then a corresponding notice is sent to the user, block 23. If the 10 transmission is successful, then the telecommunication server 4 receives the call setup message 5, block 24, and determines the B-party's telephone number on the basis of the call setup message 5, block 25. Next, the 15 telecommunication server 4 identifies the A-party's subscription, block 26, and directs the charge for the call to this subscription, block 27. After this, the telecommunication server 4 sets up a call to the A-party 1 and another call to the B-party 2, block 28, and connects these two calls so that a call from the 20 B-party to the A-party is set up, block 29.

In the procedure of the invention, the A-party's 1 subscription can naturally be identified before the B-party's subscription is determined from the 25 call setup message 5.

Fig. 3 presents an example of a signalling arrangement. The A-party 1 sends a call setup message 5 via the signalling channel of a telecommunication network 3 to an OSN server 4. In the OSN server 4, the actions required for identifying the A-party 1 and B-party 2 are carried out, whereupon calls to the A-party 1 and to the B-party 2 are set up. The OSN server 4 connects the calls and, after receiving a 30 35

call setdown request from the A-party 1 or B-party 2, disconnects the call.

In a system as illustrated in Fig. 1, the telecommunication server 4 may be e.g. an OSN telecommunication server (Open Service Node). OSN is a system designed for the development and testing of intelligent networks and for the execution of service applications. It can be applied in the control of wired telephone networks, mobile communication networks and wide-band networks. OSN is based on an open system which can be expanded via software, permitting the addition of various telecommunication network components, such as ATM (Asynchronous Transfer Mode) switches. Further, in the system presented in Fig. 1, the call setup message 5 is e.g. an USSD (Unstructured Supplementary Service Data) message. Using USSD operations, unstructured supplementary service data can be transmitted between a mobile station and a telecommunication network. The call setup message 5 can be transmitted using the CCITT common channel signalling standard SS7.

The invention is not restricted to the examples of its embodiments described above, but many variations are possible within the scope of the inventive idea defined in the claims.

CLAIMS

1. Procedure for setting up a telecommunication connection between an A-party located in country C1 and a B-party located in another country C2 in a telecommunication system comprising the A-party's telecommunication terminal (1), the B-party's telecommunication terminal (2), a telecommunication network (3) and a telecommunication server (4), the latter comprising means for handling messages and setting up telecommunication connections, in which procedure the A-party's telecommunication terminal (1), the B-party's telecommunication terminal (2) and the telecommunication server (4) are connected to the telecommunication network (3), characterized in that

the A-party sends a call setup message (5) to the telecommunication server (4) by means of his/her terminal (1),

the telecommunication server (4) sets up a first telecommunication connection to the A-party (1);

based on the call setup message (5), the telecommunication server (4) sets up a second telecommunication connection to the B-party; and

the telecommunication server (4) connects the first and the second telecommunication connections so that a telecommunication connection is established from the B-party to the A-party.

2. Procedure as defined in claim 1, characterized in that the call setup message (5) contains the B-party's telephone number.

3. Procedure as defined in claims 1 and 2, characterized in that the telecommunication server (4) identifies the A-party's subscription and directs the charge for the call to the A-party's subscription.

4. Procedure as defined in any one of claims 1 - 3, characterized in that the call setup message (5) is a USSD message.

5. System for setting up a call between an A-party located in country C1 and a B-party located in another country C2 in a telecommunication system comprising the A-party's telecommunication terminal (1), the B-party's telecommunication terminal (2) a telecommunication network (3) and a telecommunication server (4), the latter comprising means for handling messages and setting up telecommunication connections, in which system the A-party's telecommunication terminal (1), the B-party's telecommunication terminal (2) and the telecommunication server (4) are connected to the telecommunication network (3), characterized in that

the A-party's telecommunication terminal (1) comprises means for sending a call setup message (5) to the telecommunication server (4);

20 the telecommunication server (4) comprises means for identifying the B-party's subscription (2) on the basis of the call setup message (5);

25 the telecommunication server (4) comprises means for setting up a telecommunication connection based on the call setup message (5); and

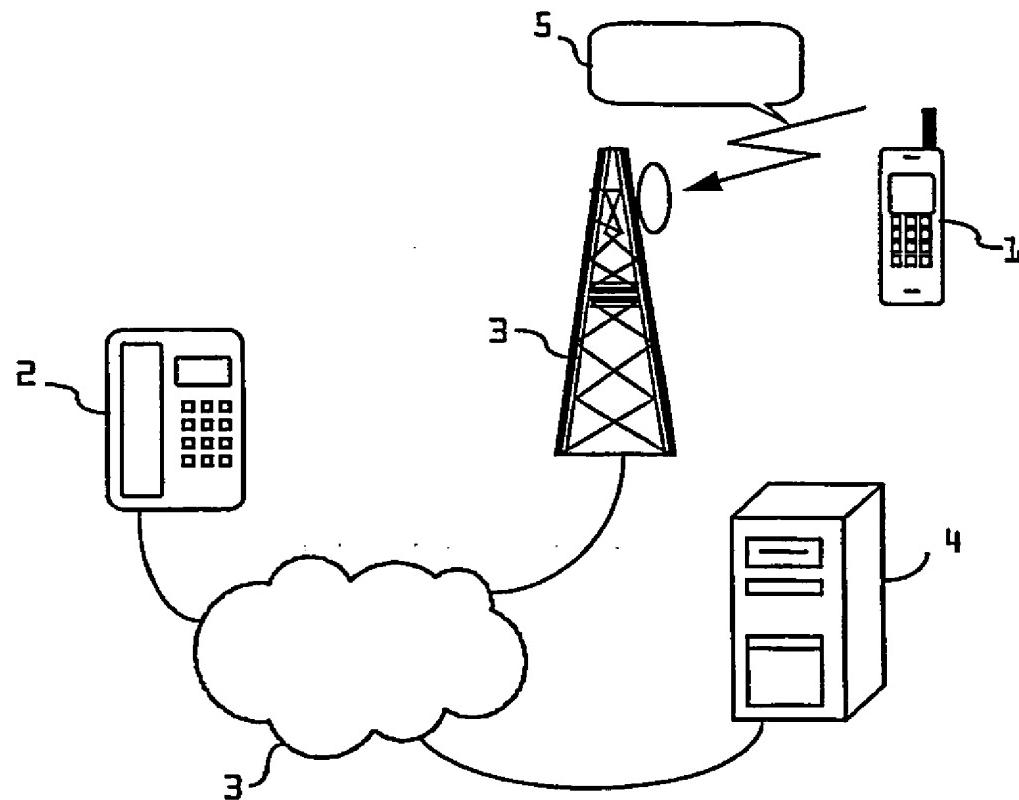
the telecommunication server (4) comprises means for connecting the two telecommunication connections.

6. System as defined in claim 5, characterized in that the system comprises means (1) for including the B-party's telephone number in the call setup message (5).

7. System as defined in claims 5 and 6, characterized in that the system comprises means (4) for identifying the A-party's subscription and directing the charge to the A-party's subscription.

8. System as defined in any one of claims 5 - 7, characterized in that the system comprises means (4) for handling USSD messages.

Fig 1



2/3

Fig 2

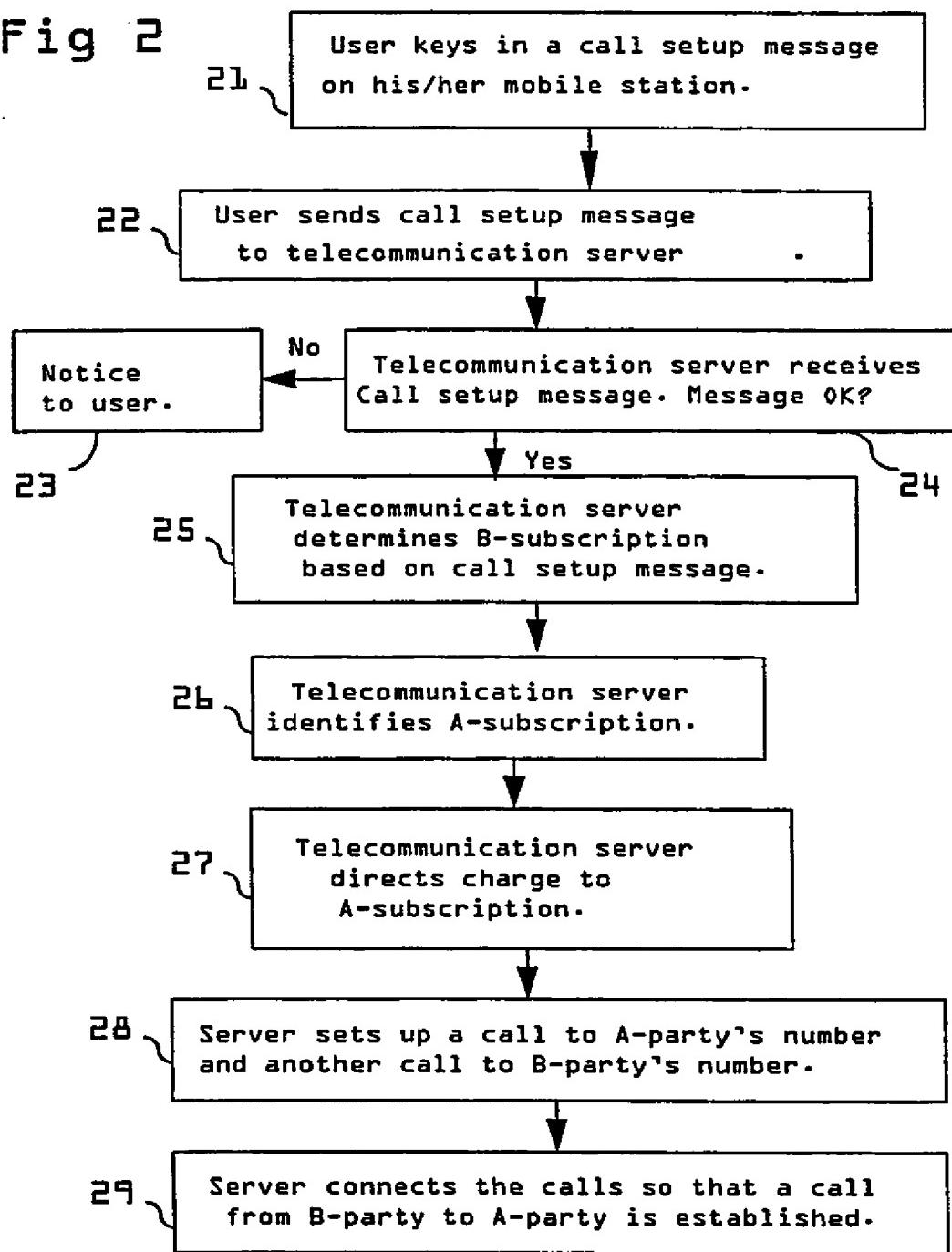
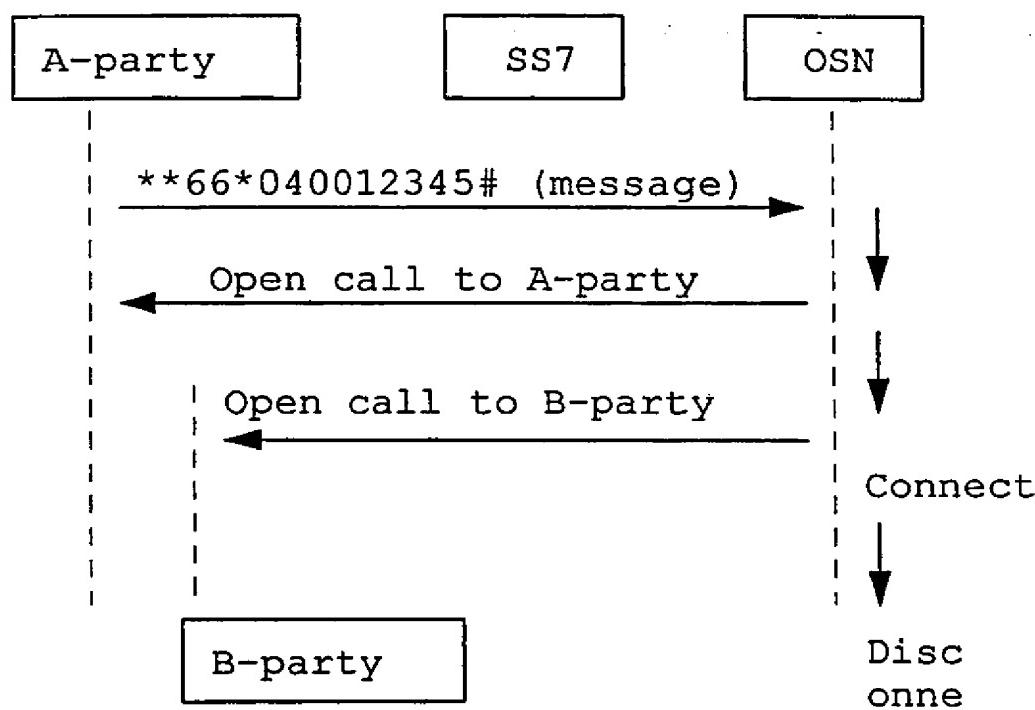


Fig 3



INTERNATIONAL SEARCH REPORT

1

International application No.

PCT/FI 99/00514

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: H04M 3/42

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: H04M, H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9719548 A1 (MCI COMMUNICATIONS CORPORATION), 29 May 1997 (29.05.97), page 5, line 6 - page 6, line 21, abstract --	1-8
X	DE 19619521 A1 (DEUTSCHE TELEKOM AG), 27 November 1997 (27.11.97), column 1, line 3 - line 32; column 4, line 62 - column 5, line 6; column 5, line 21 - column 6, line 20 --	1-8
A	WO 9728657 A1 (TELECOM FINLAND OY), 7 August 1997 (07.08.97), page 3, line 15 - page 5, line 8, abstract ----	1-8

<input type="checkbox"/>	Further documents are listed in the continuation of Box C.	<input checked="" type="checkbox"/> See patent family annex.
* Special categories of cited documents		"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance		"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier document but published on or after the international filing date		"V" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)		"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means		
"P" document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search	Date of mailing of the international search report
9 November 1999	15-11-1999
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. + 46 8 666 02 86	Authorized officer Stefan Hermanson/mj Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

28/09/99

International application No.

PCT/FI 99/00514

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
WO 9719548 A1	29/05/97	CA 2235816 A		29/05/97
		EP 0861554 A		02/09/98
DE 19619521 A1	27/11/97	NONE		
WO 9728657 A1	07/08/97	AU 1603297 A		22/08/97
		EP 0885531 A		23/12/98
		FI 2770 U		24/02/97
		FI 102126 B		00/00/00
		FI 960501 D,V		30/09/96
		FI 964275 A		03/08/97